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Connecting with Users: Developing Personas for The Improvement Of The Smithsonian's Museum on Main Street WaterSim America App

A Recommendation Report
Presented to The WaterSim
America Design Team at Arizona
State University's Decision Center
for a Desert City

ASU
**Decision Center
for a Desert City**
**Arizona State
University**

Prepared by Robin R Coburn

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Abbreviations

AL .... Alabama

APP .... Application

ASU.. Arizona State University

DCDC..Desert City Design Center

FL.. Florida

GA.. Georgia

HSD ....High School Diploma

MoMs..Museum On Main Street

PBD.. Persona-Based Design

SWWTE.........Smithsonian Water Ways Traveling Exhibition

SYS... System

WSAA .... WaterSim America App

UCD ....User-Centered Design

Report Summary

Arizona State University's (ASU) Design Center for a Desert City (DCDC) people are enthusiastic about their work. Since its launch in 2004, DCDC researchers along with WaterSim designers have diligently worked to develop exciting and innovative tools to help others realize climate changes affect water resources.

In December 2017, I was asked to evaluate the WaterSim America app (WSAA) in context of use. The goal of this assessment was to discover areas of the app that are in need of improvement. To complete this task, I constructed a contextual inquiry (CI) so that I could observe the WSAA user audience engage with the app, as well as, using the data from the inquiries to design seven full user personas to present to DCDC designers. I created the contextual inquiry using ethnographic and qualitative research methods, along with persona-based design methodologies. These processes highlighted important user attributes, as well as located areas of the app that are in need of improvement. This report documents various participants' feedback related to the WSAA in a set of findings, along with recommendations that will inform the direction of future app iterations, as well as presents seven full user personas to the DCDC.

After conducting several CIs and seeking advice from practitioners who are working in the field of PBD, I made six recommendations to improve the educational value of the WSAA and developed vital tools (personas) that will aid the DCDC as it works to inspire public awareness of water processes.

- ➢ Identify the audience you are trying to reach
- ➢ Focus on consistency to improve credibility
- ➢ Use innovative imagining to deliver the message
- ➢ Integrate cause and effect to aid in message reception
- ➢ Integrate cultural specific resources based on location and multi-languages
- ➢ Narratives should flow, not sound technical

Introduction

The objective of the SWWTE as a whole is to inspire rural people to deepen and expand their knowledge of water supply and demand and how water affects the communities in which they live. The WSAA is currently in use in several states, but there had been no research proving the effectiveness of the app and no attempt to design the app to specifically appeal to the rural audience whom the SWWTE will be serving. The focus of this study is to evaluate the usefulness of the WSAA in its current state, but also to ensure long-term changes that will improve the overall user experience. This report documents user feedback related to the WSAA, along with recommendations that will enhance and support the Museum on Main Street (MoMs) WaterSim America core message – # Think Water.

The research contained in this report concentrates on user interactions with the WSAA, then using those exchanges to determine if the desired user segments are engaging with the WSAA. To help with this, I wanted to provide the developers at the DCDC with a variety of profiles of potential WSAA users. These types of profiles of users are typically called 'personas." In user-based design (UBD), personas are tools that help design practitioners separate, analyze, and recognize user behaviors, expectations, wants and other personality attributes. Additionally, personas help designers envision how or when a user engages with a product.

This report contains the results of my activities to complete the study 'Connecting with Users: developing personas to improve the design of the MoMs WSAA.'

The Scope of Work and Deliverables

This study was conducted December 2017 through January 2018. There were 16 in-person participants, one WSAA tester (not included in the persona design), and four practitioner telephone interviews focused (1) PBD methodologies; (2) user research; (3)

scenarios;(4) persona design and delivery.   Practitioner input was significant to research and analysis. All in-person participants, as well as the tester, had not heard of the SWWTE or the WSAA.

To complete my work, I conducted a contextual inquiry to test the usability of the WSAA on target rural populations in Alabama, Florida, and Georgia. The informal usability study I designed sought first to observe users interacting with the WSAA, while 'talking aloud' sharing their observations as they used the WSAA. If participants agreed, I routinely recorded these interactions using the 'Audio Record' app for Android phones. Then, using the observations and collected interview material, I developed personas that represent typical rural users so those personas can be used by the developers at DCDC to improve the WSAA for future users who might attend the SWWTE in other states. I authenticated the personas by grounding them in the information I gathered from the usability study, historical literature and the data I collected from examining the principles of persona development.

The information gathered in this study offers essential details about the experiences of the crucial SWWTE user segment.

Methods

This section of the report focuses on the PBD methodologies used to design personas, the representative users of the WSAA; how and where I conducted the contextual inquiries, and the data obtained. I strongly recommend periodical testing with other archetypal user groups and applying various research techniques to continue to uncover further information for WSAA progression.

My methods for developing the personas for this project efficiently followed standard PBD guidelines, research, development, and verification processes.

Practitioner Interviews

The first investigation I did was practitioner interviews. For this type of research, I conducted one informal telephone interview with practitioners working in the field of PBD. I choose to

interview PBD practitioners as they have a working knowledge of the methodologies that guide PBD, such as conducting ethical research, usability testing, and how to recognize, and remove bias when it appears. In this type of research, I looked for common features across the interviews, what type of research methods they use, and how to apply those methods to the persona design.

I recruited participants through professional contacts and conducted these interviews over the span of one week. The discussions took about 45 minutes to an hour. I prepared the interview questions in advance but prepared to adapt to freely ask questions for gaining a more in-depth response. I recorded the calls using Windows Voice Recorder, which I later turned into a written transcript. I later used these transcripts for reference.

I interviewed real persona developers asking them what the most important skill a PBD designer should have. They agreed that storytelling skills are a primary persona design talent followed equally by the abilities to synthesize data, conduct qualitative research, along with having strong interview skills and the ability to empathize with subjects (Madison, Braeden & Taylor 2016, Ava 2017).

Personas: Why Use Them?

Personas are created by designers who create profiles (descriptions) of end user's abilities, motives, wants and expectations. Persona profiles describe user habits, interests, needs, and preferences. Profiles become communicative patterns that help designers understand the user better.

Several personas are typically created to fill many user roles; for this reason, designers build user scenarios to identify user goals. I learned that these storylines allow designers to imagine how the product will work or how it will be used.

The decision to use personas aided in segmenting research data, while I discovered and interrupted user attributes. More importantly, personas conveyed solid examples of real users.

"Persona ain't a person unless it's driven primarily by an understanding of real users."- Taylor, PBD Practitioner (2016)

PBD Method: Scenarios

Scenarios help to cut data review time, as well as make the personas more effective by helping designers relate to users, thus encouraging those designers "to go the extra step to develop something that will work for real users" (Harley 2015). Knowing this gave me an accurate perception on how to relate and communicate the research to form user scenarios that place focus on a specific user type.

Consider scenarios as an investment, not only will they improve persona quality, they give you answers to what the users need and help you find what product areas are in need of improvement. Scenarios add familiarity to the persona, which helps designers to think beyond the product; puts focus on what role the product will fill in the users' life. We begin to see the persona as an actual entity acquainting us with user tasks. In other words, scenarios cause empathetic reasoning; we think about the real people who are using the product.

PBD Method: Empathetic Research

Actual "empathy in design is simply taking the time to carry out user research, absorbing it into your thinking to guide your decision-making processes" (https://www.interaction-design.org). The role of the designer is to advocate for the user. Empathizing while critically questioning my assumptions is crucial to user research.
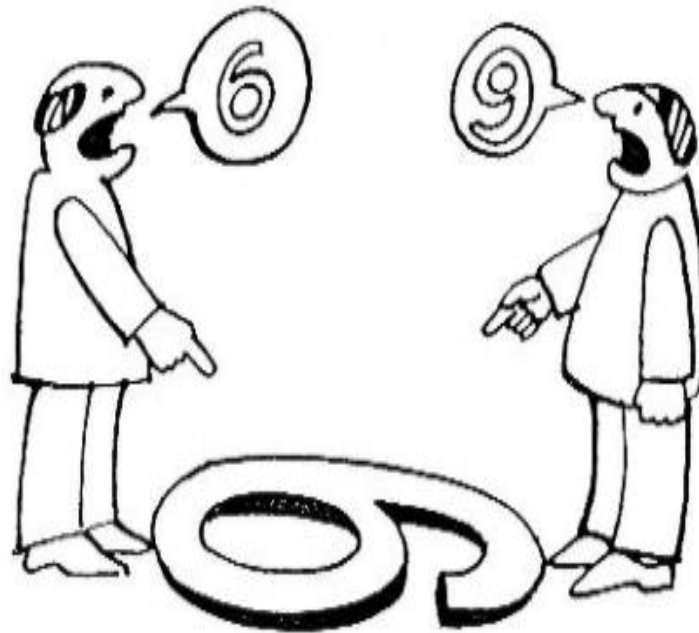
Figure 1: Illustration Point of View from Designing for Empathy Toolkit.

Defining the Audience

The next step in my process was to find my "target user segments" (Kramer, Noronha & Vergo, 2000). Identifying the user audience aided me when I began seeking study participants. Once I determined who the users are, I began noting SWWTE host cities' population statistics. After that, I established a user basis derived from statistics and personal observations. From this point, I began more statistical population research of rural areas in the South Eastern, United States. The results of this research helped me construct a basis for finding potential study participants. It was at this point that I found essential user segments within communities that were familiar or accessible to me (falling within a 300-mile radius).

Participant Locations

LOCATION	POPULATION
Titus, AL	2,424
Wetumpka, AL	8,219
Greenville, FL	796
Monticello, FL	2,402
Hahira, GA	2,937

Table 1: Source, Population statistics retrieved from the 2017 US Census https://www.census.gov/

LOCATION	POPULATION
Spanish Fort, AL	8,327
Jasper, AL	14,003
Selma, AL	18,983
Elkton, KY	2,136
Alexander City, AL	14,875

Table 2: Population statistics retrieved from the schedule https://museumonmainstreet.org/content/tour-schedule

To find participants who I could study as they interacted with the WSAA game, I initially recruited from my local rural area, including contacting personal, professional, friends and acquaintances. The first set of participants were found in rural Alabama communities and were personally known to me. Before I began observing the participants interact with the WSAA, I created a script to read before the study and asked participants to sign a consent form (attached Exhibits "A" and "B"). Since the first set of participants were known to me, early on it became clear that observations were becoming tainted by response bias (e.g., the respondents were trying to please me). For this reason, I sought out participants by doing cold-calls/unsolicited visits to small-town libraries.

Spontaneous introductions and requests to take part in studies is nothing more than awkward, for this reason, before the in-person studies, I pilot screened the WSAA using a test screener. This screener was someone not included in the study. The purpose of the test screener was to avoid any unforeseen technical problems occurring during the research study.

> *"I believe you should always be willing to abandon or adapt your plans to take advantage of changed circumstances. We should always be willing to ride the waves." -Gerry Gaffney (2015)*

At first, I intended to conduct before, during, and after participant interviews. However, those were not possible in the context in which I was working therefore after identifying the people, and knowing I had the endorsement of ASU's DCDC and the Smithsonian to substantiate my research; I threw out the prepared script, opting for a 1-page handout (attached Appendix "D"). The handout features, in brief, significant details about the SWWTE and the purpose of the display, along with my contact information. The simple, yet colorful handout, spoke more than some people allowed me to, providing the who, what, why and where. This type of communication tool drew people into me; they came close which gave me the opportunity to introduce myself. Note: More people took the handout than participated in the inquiry, meaning communities became aware of the SWWTE.

I found participants in two small-town libraries in five counties, all within a 150-mile radius of my location. It made sense to seek participants in these types of business because many rural areas rely on libraries, churches or community centers to provide cultural and social experiences. I found other participants in two more farm supply companies, a courthouse, a deer processing and taxidermy business.

Participant: Demographics

I recruited 15 (not including screener) participants throughout towns in Alabama, Georgia, and Florida. Participants are exact representatives of SWWTE projected user segment, who self-identified as a male whose ages ranged from 20 – 57, and females whose ages ranged from 22 – 78 years old. When asked,

participants self-identified as Caucasian, Black, Cherokee, Hispanic, and American ethnicities.

PARTICIPANTS	GENDER	AGE	OCCUPATION
Alabama 1	F	73	Retired Professional
Alabama 2	F	58	Homemaker
Alabama 3	F	62	Retired Professional
Georgia 1	M	27	Kayak Rental
Georgia 2	M	37	Farm Manager
Georgia 3	M	42	Water Sys Manager
Georgia 4	M	35	Horse Breeder
Georgia 5	M	38	Retired Military
Georgia 6	F	33	Homemaker
Georgia 7 (Tester)	M	35	Military
Florida 1	F	27	Library Director
Florida 2	F	56	Bookkeeper
Florida 3	F	22	Student
Florida 4	F	32	Library Director
Florida 5	M	22	Student
Florida 6	M	53	Store Manager

Table 3: Participant demographic data

The Contextual Inquiry

With willing participants, I began to test the effectiveness of the WSAA. I did so by first describing to participants the MoMs

atmosphere in which the app would be presented to the public. I asked each participant to imagine themselves in this setting, and act as they would if they were in that setting. Statements such as these reassured the participants while allowing me the opportunity to observe reactions and body language. These forms of non-verbal communication often speak more honestly than words participants who I could study as they interacted with the WSAA game.

Participant Engagement: Setting the scene

I worked with participants individually, using a 10-inch iPad pro and a mobile hotspot that I carried around (a hotspot is needed to connect to the Internet connectivity to the WSAA). When a potential participant agreed to contribute, I would let them hold the iPad, or if available, I would place the iPad on a table or counter top. I asked each participant to imagine themselves in an exhibition setting like a library. I told them to imagine there are posters on the walls, people talking and walking around. I asked participants to 'think-aloud' while engaging with the app, stating that it would help me with my research. I reemphasized that the participants were in control, reiterating that they could stop at any time, and that I would not judge them. Nor would they hurt my feelings.

I asked participants questions to discover levels of skill in areas such as online shopping, or gameplay. The purpose of this questioning was to determine what level of experience these rural users had with interactive user-centered products similar to the WSAA. The results were; 100% of the users responded they used their cell phones to play games find information and communicate, and 99% stated they shop online.

I asked participants if they have or were going to or would like to attend an informative exhibition like the SWWTE. The answers varied with 90% saying, they would want to visit the exhibition, and the remaining 10% stating that they were not interested. Then I asked participants to tell me what they would do if they ran out of water. Participants provided a range of responses to this question, many of which I included in the personas I developed.

The data I collected from these app interactions, along with demographic facts helped me begin to define the user personas. I mapped out things such as such as time participants spent

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engaging with the WSAA, and paid attention to factors such as when they stopped interacting with the app, what they said they found exciting or frustrating in the think-aloud protocol.

Analyzing the findings

I am now going to summarize/list the feedback that participants provided about the app. I included the test screener comments because they are almost identical to participant comments (although the test screener spent more time interacting with the app).

Screener Comments

- Game instructions were long and excessive. The tester wanted to stop after the first set of instructions.
- The game narration was dull. It is mundane having no exciting fluctuations that would make you buy into playing the game. Tester stated it would be at this point he would stop, saying that the narrator's voice was too monotone and boring.
- The game verbiage was inconsistent (see "buckets" less, low, etc.) and confusing.
- Too much on the game screen; graphs and lines were frustrating. It reminded the screener of a school book circa 1980s.
- The most useful game information as found in the drop boxes at the end of the game. The DCDC should include this information during the decision-making phases.

What test screener liked

- The introductory video because the video images were vibrant.
- The vivid home screen photos.

Other Screener Comments

- Screener said this app was misleading because it was not a game.
- If attending the exhibition, the screener said they would stop interacting before the game instructions ended.
- The screener said he would like the home screen photos to do something like lead to a video.

GA 1 – GA6 and FL 1- FL6, made the same comments. Each said the monotone game instruction video was confusing, making them not want to pay attention.

The WSAA has two narrations: introduction and game. Participants approved the introduction narration because of the supporting video.

Notable Participant Feedback

I received substantial feedback and witnessed significant participant reactions. I will now summarize these findings according to WSAA screen relevancy.

Participant Engagement; Home Screen

Figure 2: WSAA Home Screen

- 4 out of 15 participants selected the introduction
- 5 out of the 15 selected the top left photo
- 1 out of the 15 first chose the chicken photo
- 1 out of the 15 selected all images
- 7 out of the 15 chose play game first

I asked each of those 7 who chose play game first (five males and two females), why they chose to play the game instead of the introduction. All gave similar replies, "it made sense because I thought the game would be enjoyable.

I asked all 15 participants to explain the choices they made. The responses were as follows:

- Those who selected image icons said they expected the photos to tell them something. In other words, the participants wanted the pictures to give them information.
- I asked why they did so, and GA 4 said, "I chose chickens because I love animals. I thought it would show how water shortages affect animals."
- I asked GA 2 why he selected the photo first; he said, "because I expected it to do something." Note: this same participant grimaced and stopped immediately after pressing 'play game.'
- I asked the FL 2 participant, who had selected all the photos why he'd done so; he said, "they should do something. "Why are they there?" "Why isn't there any photos of rivers in this area?"

All the participants found the home screen visually appealing, saying they liked the photo images. Their expressions showed interest as they watched the introduction video.

During these feedback sessions, I asked participants, how they felt when listening to the introduction narrator; participants expressed a half-hearted 'he's alright.' I can only attribute reactions like this to participants who wanted an interesting or entertaining learning experience. For instance, I noticed that throughout the inquiry all participants seemed to focus on the chicken or flowing water photos, and because the introduction

video included true to life visual stimuli; participants were more accepting of the narrator. This made them willing to hear the message, even so, it is my opinion, having considered the results of this inquiry, and other recent observations I believe DCDC designers should consider revising both narrations. For example, in a separate observation, I observed a group of National Park visitors interacting with a Welcome Center display. I applied the processes I developed throughout the WSAA study, applying them to my new observation and game up with the same conclusion; the visitors found the presentation interesting. To prove my hypothesis, I approached two people, then asked them what they liked about the introduction video. Each person said they liked the presentation because the narrator interacted with their surroundings, saying, "I felt like I wanted to listen, and I learned something." What I discovered confirmed the results of this study; WSAA participants are likely to pay attention, receive and discuss the MoMs message if they can relate the message to the process. For this reason, participants deemed the introduction narrative as 'okay,' which means the participants heard the narrative, but no one listened. This makes sense because none of the participants commented on the length of the introduction, which possibly says, they did not pay attention to the introduction message. Those participants who selected the images on the home screen were very disappointed (verbally and physically – expressions and body language).

The WSAA game narration, to include, information overload was the primary reason participants who stopped interacting with the game (immediately, or almost immediately) did so. Those same participants made faces while listening to the WSAA game narration. Incidentally, those participants who selected introduction fall within the first persona's age demographics (see page 22).

Participants who selected play game, did not finish the game. However, AL 1 and AL 3 worked together and chose the introduction and then selected the game, ultimately finished the game. After leaving the game, 3 out of those five were immediately returned to the home screen. Then, they selected the top left photo on the screen. This group of participants opted to press picture icons and not select 'Introduction.'

Participant Game Feedback

Narration

- AL 2, GA 2, GA 4, GA 6, FL 1, FL 2 and FL 3 stopped interacting within seconds of hearing the narrator speak.

These results are attributed to the DCDC's inability to discover and understand the intend audience. The game's presentation lacks personality and motivation to engage. For example, compare the introduction video to the game narration. First, the introduction video identifies the voice of the person; the game narration is a speaker giving direction. Second, even though the introduction adds a personality to the message, it is the imagery that empowers the storytelling. In other words, the images create a succulent story. The game presentation lacks the personality and comes across as being dull and scholarly. For instance, the game narration and graphics do not connect with the audience because both seem unapproachable, somewhat cold. Inquiry participants disengaged from the WSAA and were not impressed.

Overall Game Comments

- AL 1 and AL 3 finished the game working together to balance the water supply through two scenarios. These were older participants who; I believe, wanted to please me.
- GA 1 and GA 7 continued to play the game after the 1st run model.

Game Screen Comments
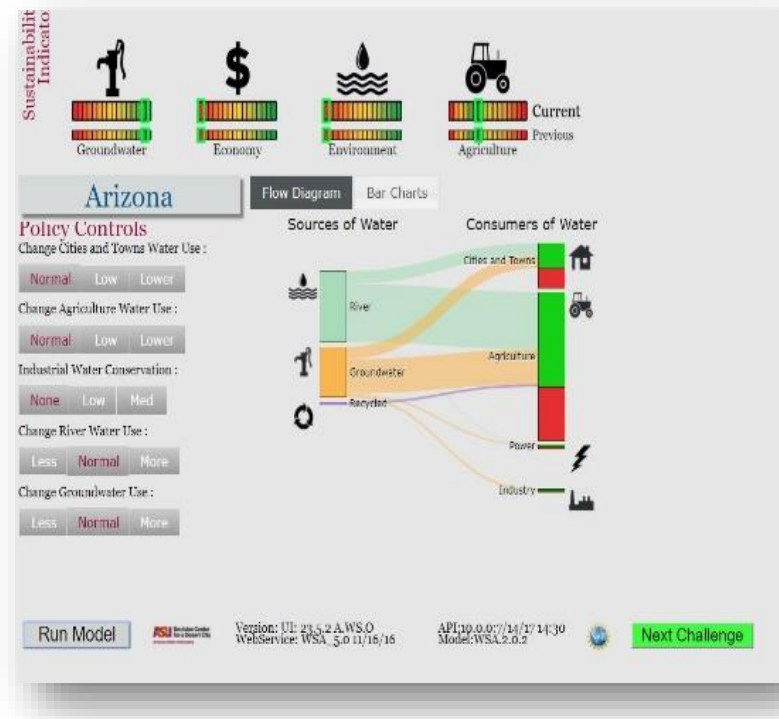
Figure 3: *WSAA Game Screen results are shown using flow diagrams and bar charts. Participants like GA 1 want to see cause and effect images, rather than charts.*

- AL 1, AL 3, GA 1, GA3, GA 7 and FL 4 participants tried the 1st run model.
- GA 1 stated that instead of showing the graphs, he would learn more if images that guide or instruct. For example, pictures showing the effects of water imbalances (cause and effect).
- Participants who tried to play the game were incredibly disappointed verbally and physically (demonstrated through expressions and body language).

Final Game Screen

Figure 4: Final game screen

Participants AL1, AL 2, AL 3 openly discussed the word "permeable surfaces" found in the increase water supply selection of this slide. They were questioning each other what permeable surface was. They spent 2 -3 minutes talking about the meaning of the word. Soon afterwards, AL2 said, "Just Google it." AL 1 later said, "oh, if we'd finished reading it we'd see that it says absorbs water." This is the only discussion about the language or wording, other than the statement made by the tester.

Participant Engagement Time Scale
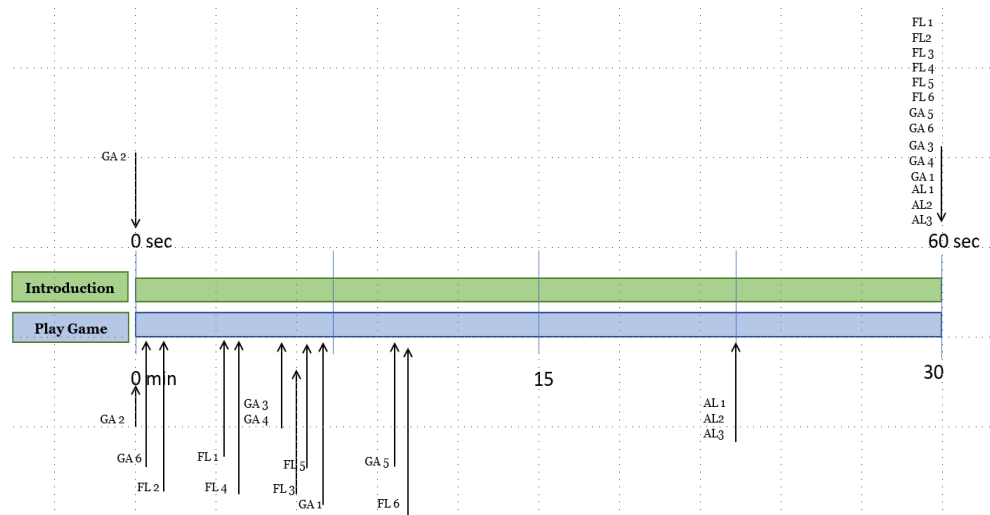
Figure 4: Participant engagement coded time scale.

- AL 1-3, working together, spent more time with the game because AL 2 became extremely irritated with the game. AL 2 walked out of the room two times. When other participants engaged with the game, AL 2 tried to disrupt them.
- The time FL 6 spent time with the game was due to several customer interruptions. FL 6 tried to stay focused but ultimately left the game so that he could satisfy the needs of his customer.
- GA 1, GA 3 & GA 5 dedicated to completing them game. They were vocal and determined. When they decided to leave the game, I asked them why they stopped and why they stayed involved as long as they did. GA 1 said it was partly personality, and that he was interested in water conservation.
- GA 3 said it he works in water conservation, and he was genuinely attentive.
- GA 5, said it was primarily personality.
- GA 5, said it was mainly personality.

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Creating the Personas

I would like to reiterate the purpose of the personas is to serve as communication tools. These tools will help DCDC designers understand and relate to the intended WSAA user segment.

An interesting aspect of this inquiry is that physical communication identifiers are misleading this is why I must emphasize communicating with the participants is important. For instance, I noticed participants stopped talking, then they would fidget and frown. I thought they were nervous or wanted to stop participating. To verify my observation, I prompted those participants to continue thinking-aloud, saying, "I noticed your frown, is there something you are looking at that you don't like? Please tell me why?" The participant said, " I'm confused; I am not sure what to do next. I'd like to see an image showing the effect droughts have on crops. That would help me understand what I should do to manage the water processes." Conversations such as this helped me develop assessments of the participants, and I began to understand the choices they made. I learned what they expected and their opinions of the app.

At this point, I used the research to design simple personas based on participants in this study. I gathered information on topics such as:

- App features that frustrate seniors
- Designing apps for seniors
- Hispanic rural population statistics
- State and County education statistics
- Dairy farming practices

Then, using the simple personas, I began to map user scenarios to build full user personas. The scenarios included context – the who, what, where, why and when. As I developed a scenario map, I thought about the expectations of the user. Where will they use the app? Why will they use the app? Will they be alone? What do they need to know? What do I need to know to complete the scenario? I considered users';

- Goals and motivations
- Ambitions

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- Frustrations
- Experience
- Views

While creating the scenarios I empathized with the users, as well as considered the needs of WSAA designers. Knowing WSAA designers had not conducted any user research I opted to create elaborate user scenarios that would give more story detail. I wanted to give the designers a fuller understanding of WSAA user attributes. This information would help those designers as they improve the content and usability of the app.

Figure 5: retrieved from creative commons. This Photo by Unknown Author is licensed under CC BY-SA

The next step I took in the persona design, was deciding which presentation format to use. I downloaded the persona template seen in Figure 6 to use as a reference. Then, based on PBD research data I restructured a model that would suit the needs of WSAA designers.

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Figure 6: Free downloadable Persona Template retrieved from
https://www.digitalgov.gov/resources/digitalgov-user-experience-resources/digitalgov-user-experience-program-usability-starter-kit/

The Personas

The final personas identify a variety of WSAA user attributes, many, which were overlooked by DCDC designers. For example, the majority of this study, know more about water processes than I do. They are cognizant about the important role water policy, and processes play in their lives. These personas represent people who fall within the WSAA key user segment. I created dynamic personas in a manner in which they are like the characters they represent, capable of changing, and developing new ideas and ways of doing things.

Perky Penny

Retired

Age	78
Location	Titus, AL
Status	Widow
Education	High School
Tier user	Enthusiastic

Generous Plucky Passionate

Brand Association

About Penny

Having spent 42 years dedicated to her profession, Penny is adjusting to retirement believing it hard to find her place. She is an Elmore County Food Pantry volunteer and "donates" $20 a month to Wind Creek Casino. When Penny isn't giving back to the community, she's spending time with family and friends. Penny delights when she is given the opportunity to be part of something new. What Penny wants most to be is to be active.

Motivations
- Family
- Loving
- Involvement

Hobbies
- Gardening
- Cooking
- "Donating" to the casino

Frustrations
- Cigarette smoke
- Penny can't understand why Casinos have small non-smoking areas
- People taking more than they need

WSAA Behavioral Considerations
- Outgoing
- Supportive
- Empathetic
- Loyal

WSAA Experience Goals
- Needs to know why the SITWE is coming to town
- Wants to figure how she can show others how to use the WSAA
- Expects the WSAA to interesting and easy to use
- Wants the WSAA to show her new ideas
- Wants to tell others about the WSAA
- She can't believe has SI an exhibit in her town; she wants to feel like she's being exposed to cultural concepts

WSAA Frustrations
- It exasperates Penny when fonts are too small to read
- Would like to adjust screens and font sizes herself
- She becomes cross when people assume older people aren't tech savvy

"Usually, I use the apps on my phone to take pictures, text and play games like Bubble Witch."

Typical Technology Usage
- Uses her iPhone only. She uses it to search the internet, check email, take photos, bank accounts, post to Snap Chat, Instagram, Facebook and her Match.com, and Farmer's Only accounts

Positive Pedro

Fig 23.
https://www.flickr.com/photos/xxxxxx/TX/14593837

Farm Manager

"I love farming, its in my blood. It's what I do."

Age	29
Location	Hahira, GA
Status	Married
Education	Some
Tier user	Undecided

Devoted   Kind   Curious

Brand Association

"If I ran out of water, I would filter the water from the irrigation reservoir."

About Pedro

Pedro is a full time Manager of a multi-functional farm. Which means Pedro is a busy man, yet always willing to make time for family. Pedro is proud of farming, it is his passion. Pedro is trying to improve his communication and technological skills. Even so, Pedro has become a respected member of the agricultural community. But, what he wants most is to own a farm, travel and interact with those outside his farm community

Motivations
- Family
- Ideas
- Hard work

Hobbies
- Family Time
- Cooking
- Fishing
- Riding Horses

Frustrations
- Someone making assumptions about him because of his accent
- It disappoints him when others give up easily
- He is disgusted with those who harm animals and children

WSAA Behavioral Considerations
- Extrovert
- Reflective
- Productive
- Objective

WSAA Experience Goals
- Wants to feel at ease while using the WSAA
- Would like for his Spanish speaking Mother to use the WSAA
- He would like the WSAA to be enjoyable
- Expects to tap on the WSAA picture icons to steer the WSAA message
- Will expect his family to use the WSAA with him

WSAA Frustrations
- Pedro is confused because the WSAA designers failed to create a bilingual app
- Felt the photo icons were misused
- Dissatisfied because he doesn't understand the purpose of the WSAA

"Farming is very technological. For instance, I use the 'Farmer's Grow On the Go' app because it is available in Spanish.

Typical Technology Usage
- Mostly uses his Samsung Galaxy Android to search the Internet, check email, take photos, get news and to connect with friends
- Plays Deus Ex: Mankind Divided on his son's Sony PlayStation

Action Jackson

https://www.flickr.com/photos/29388
462@N06

Sport Fisherman

Age	31
Location	Lakeland, FL
Status	Married
Education	College Degree
Tier user	Expert

Sharp Practical Active

Brand Association

"If I ran out of water I would dig a well."

About Jackson

Jackson is an Air Force Veteran who recently returned to his small town roots. Now, Jackson and his wife, Katie are trying to fulfill his dream; open a fish farm. And, when he isn't working his Fish Management degree, you'll find Jackson fishing. Recently, Jackson reeled-in a third place finish while competing on Lake Eufaula, AL. When he's not thinking of fish, Jackson spends time with his family and friends. What he wants most is to be that guy who made things happen.

Motivations
- Goals
- Family
- Competition

Hobbies
- Fishing
- Kayaking
- Hunting

Frustrations
- Someone saying "it can't be done"
- Laziness
- He is afraid of the day he can't give it his all

WSAA Behavioral Considerations
- Extrovert
- Strategic thinker
- Is a leader
- Innovative

WSAA Experience Goals
- Expects to the SI sponsored programs to be well-thought-out
- Wants to be impressed by the WSAA
- Would like to learn something new
- Trusts that the WSAA message will be clear
- Wants to corroborate his water usage knowledge
- Expects to be receive a consistent message

WSAA Frustrations
- Narration was lengthy
- Dissatisfied because the game was missing cause and effect images
- Found the game screen too busy
- Annoyed that when end game was selected, the user is left lingering waiting to see if there is more

"We've become technology obsessive, its like we spend most of our time trying to keep up with it."

Typical Technology Usage
- Uses his iPhone to search the Internet, check email, take photos and for social media
- Uses his Amazon Fire TV to watches his favorite TV shows, The Grand Tour and Fargo

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Spirited Sofia

Library Director

"I want to motivate others"

Age	30
Location	Greenville, FL
Status	Single
Education	Jr College
Tier user	Involved

Friendly   Willing   Energetic

Brand Association

First I would get water from the three rivers surround Madison; Withlacoochee, Suwannee, Aucilla. Or, the Blue Hole. " "

About Sofia

Sofia is a full-time Director of a small town library and a full-time mother to a 6-year old son. Sofia spends her off-time with her family; cooking, playing online games and reading. Sofia doesn't travel and shares the same lifestyle as other members of her family. She even has the same occupation as her cousin Vivian. Both are Library Directors. She feels she must help the community expand their dreams and knowledge.

Motivations
- Self-actualization
- Civic Leadership
- Social Influence

WSAA Behavioral Considerations
- Extrovert
- Enthusiastic
- Flexible
- Persuasive

Hobbies
- Reading
- Shopping on Line
- Spending Time With Family

Frustrations
- Mundane daily rituals
- She spends countless hours thinking of ways to revive public curiosity in the library

WSAA Experience Goals
- Wants the WSAA to be interesting
- Wants to be impressed by the WSAA
- Wants the WSAA to peek her community's interest in library events
- Wants the WSAA to be educational
- She expects the WSAA to be easy to use
- Her expectations are high, because she's impressed with the Smithsonian brand

WSAA Frustrations
- Narration was lengthy
- Dissatisfied because the game was missing cause and effect images
- The game screen was confusing and left her wondering what to do
- When asked, she said she did not learn anything while using the WSAA

"Technology keeps me connected. For instance, I get most of my news from the Internet."

Typical Technology Usage
- Uses her iPhone to search the Internet, check email, take photos and for social media
- Uses her iPad to shop, watch YouTube videos, post to Facebook and her Match.com account.

Complex Peggy

Natural Historian

"If I can't learn if from nature, I'll Google it."

Age	41
Location	Wetumpka, AL
Status	Single
Education	Trade School
Tier user	Defiant

Eccentric   Kind   Opinionated

Brand Association

"I would use the water I've collected in garden rain barrels. If more was needed, I would go to Winn Dixie and buy more."

About Peggy

Peggy is a full-time herbalist. Most of the time you will find her outdoors. She enjoys making homemade soap, volunteering at the animal shelter. Actually she thinks her pets make more sense than humans. Peggy has traveled and considers herself free-thinking. Even so, she often feels anxious in public places. When in those situations, she is disruptive, distracted and always interrupting others.

Motivations
- Affirmation
- Influence
- Creativity

Hobbies
- Conspiracy Research
- Hiking
- Gardening

Frustrations
- She gets irritated when people do not keep their word
- It infuriates her when, "no one uses their common sense," or won't listen to her
- She is concerned that she is afraid to make mistakes

WSAA Behavioral Considerations
- Extrovert
- Skeptical
- Expressive
- Direct

WSAA Experience Goals
- Expects SI affiliate products to be awe inspiring and informative
- Wants the WSAA message to be brief
- Wants to be entertained
- While using the WSAA she wants to interact with others

WSAA Frustrations
- Game narration was drawn-out
- The game was not fun
- Wondered why the information drop boxes weren't used throughout the game
- Felt there was no product uniformity; game theme did not match introduction

"I love technology! Yesterday I downloaded Pocket Herbalist app to my phone."

Typical Technology Usage
- Uses her laptop to search the Internet, check email and post to her blog, Herb Girl
- She loves using her Amazon Fire stick so much that she carries everywhere she goes
- Uses her Huawei Android phone to search the Internet, take photos and post videos to Facebook

Traditional Teddy

Dairy Farmer

"I want to leave something for the next generation."

Age	63
Location	Slapout, AL
Status	Married
Education	High School
Tier user	Hesitant

Trusty   Thorough   Firm

Brand Association

"I would use the water from the water collections tanks; we save up to 30 gallons in each off-season."

About Teddy

Teddy is a third-generation Dairy Farmer, father of 3 adult sons and 1 teenage daughter. Teddy, like his father Abel, was born into the business and has never worked another job. In 1998, Abel handed full control of the 120-acre farm to Teddy. He has increased the size of his herd from 80 to 220. Someone once asked Teddy, "Why don't you sell and slow down?" Teddy's reply was classic Teddy; "Hard work makes life worthwhile. I'll rest when I'm in the ground." The word vacation isn't in Teddy vocabulary, even-so, he's aware his wife Velma is ready to take a break. Teddy is trying to accept and adjust to the changes within the farm industry. He is relying on his children to explain all the high-tech 'mumbo-jumbo' to him. What Teddy wants a fourth-generation running the farm.

Motivations
- Family
- Hard Work
- Integrity

Hobbies
- Farming
- Fishing
- Watching TV

Frustrations
- Cruelty
- Laziness
- Cheats

WSAA Behavioral Considerations
- Realistic
- Responsible
- Direct
- Structured

WSAA Experience Goals
- Wants the WSAA to be easy to use
- Wants to be impressed by the WSAA
- Wants to briefly interact with the WSAA
- Expects to be surprised and learn something new

WSAA Frustrations
- Narration was lengthy
- Game reminded him of work; he's taking a break
- Game screen was confusing because of the layout and the lack of directions
- Game was pointless because there was no clear statement of cause and effect
- Disappointed that the Smithsonian would display such a disappointing product - he expected better

"Technology is like farm taxes, its forced on me. So, I deal with it."

Typical Technology Usage
- Uses his Samsung Galaxy Android phone to search the Internet, check email, take photos
- Uses his desktop to control inventory management. Currently he is using the Vertical Software program.

Free Bree

https://lenatemeteness.org/ScreenDigrameetl5.0/

Store Clerk

Age	25
Location	Mossy Head, FL
Status	Divorced
Education	Some HS
Tier user	Casual

Laidback   Sassy   Caring

Brand Association

"If, I ran out of water? I won't 'cause we have creek and well water."

About Bree

Gertrude Brianna 'Bree' Gunnels is a divorced mother. Recently she moved back into her parents home. Bree sees life as a learning experience believing that practice makes perfect. A cashier by day and mother to four year old Quinn at night, leaves Bree with little time for anything else. Its Bree's ravenous appetite for life that won't let hard times get her down. Bree thinks she has a life plan. Even so, her parents see her as immature, attributing her naivety to wasted time on Facebook. Bree feels different, she believes she knows what the world is about. What Bree wants most is to support herself.

Motivations
- Son
- Happiness
- Social Position

Hobbies
- Spending time with friends
- Swimming at the creek
- Sketching

Frustrations
- Cruelty
- Laziness
- Cheats

WSAA Behavioral Considerations
- Extrovert
- Dreamer
- Silly
- Optimistic

WSAA Experience Goals
- Wants to enjoy using the WSAA
- Wants to be impressed by the WSAA
- Wants to talk about the WSAA
- Wants Quinn to use the WSAA with her
- Expects to see vivid visuals and hear interesting story lines

WSAA Frustrations
- WSAA Frustrations
- Narration was boring
- Never understood the purpose of the game, or why it would be called a game
- Game layout was confusing
- Game graphics hurt her eyes
- Let down because she expected to see something similar to the shows on Smithsonian channel

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"Technology, OMG! I couldn't live without the Internet or Facebook or any of it!"

Typical Technology Usage
- Uses her iPhone only. She uses it to search the Internet, check email, take photos, bank accounts, post to Snap Chat, Instagram, Facebook and her Match.com, and Farmer's Only accounts

Recommended Actions

The following recommendations do not fall in order of necessity because each is relevant to future iterations of an improved WSAA;

- The DCDC should use the personas as tools to help connect them with their users.

- Credibility is a vital component of message delivery especially when trying to persuade. The DCDC should use words, screen formats and images that are familiar to their audience. Doing so will help people feel at ease and accepting of the information they are given.

- Touch screens are available to everyone. We use them at gas pumps, on our phones, when we play games and while working. In some cases, we use touch screens while at the doctor's office. Participants in this study said they want image icons to deliver messages. They expect the images to inform them. The DCDC should use image icons to guide and instruct users.

- Users focus on the important elements of messages if shown cause and effect. The DCDC should find a way to show its audience what happens if water processes are not balanced. Show the user images that illustrate the level of distress the imbalance causes.

- Give the users language options. The WaterSim designers should seize the opportunity to develop a bilingual app. This research proved that people whose secondary language is not English did not engage with the WSAA.

- Change the narratives. The CI findings, without a doubt, prove the game narrative sounds technical. Participants felt subjected to fast-paced information overload. In its current state the game narrative is causing users to spend time thinking. Users are analyzing the content and trying to understand what they heard. The DCDC must consider the context of use; where people will use the WSAA; why the audience is there? What they will expect? What they will want to do; will they be alone? What is their user knowledge? How long will they want to spend doing it?

The persona tools presented will aid the DCDC as future iterations of the WSAA continue to evolve. The information found within this report is useful as a reference and reminder to both DCDC researchers and designers, that understanding the user is the key to producing a practical end product.

Conclusion

Applying the CI method, I interviewed and observed participants while they used the WSAA. Participants could make user decisions based on their wants, or expectations. My adaptation of the CI technique worked perfect, allowing me the freedom to seek and find participants in locations comparable to the areas where the WSAA will be displayed. I benefited from audio recordings; they helped me track and confirm participant reactions, and statements which helped me find areas in need of improvement, and then fully design personas.

The process by which I conducted this CI, as well as developed the personas, was resourceful, meeting timelines and fiscal limitations.

This study is a success based on the factual data gathered through research and interviews. The decision to conduct cold-call contextual inquiries was the pivotal point in the research because I observed unbiased engagements. A surprising aspect of this study is that rural

citizens are keenly aware of water processes such as conserving it, sharing it, and where to find it if they run out.

Acknowledgements

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Appendix A

Practitioner Interview Questions

1. What is your job title?
2. How many years of experience do you have been doing this type of work?
3. Do you hold a degree that is specific to person- based designs?
4. How much of that time have you been working with "X" Company?
5. Why did you want to work for "X" Company?
6. What is your job title?
7. Please describe what you do in your job.
8. What percentage of your job is persona exploration? How much time do you actually spend creating persona- based designs?
9. How many projects do you work on at a time?
10. What is the largest project you have worked on?
11. Are you part of a design team? Is this true all the time? Why?
12. Do team members have similar backgrounds (i.e., college degree, age, culture, local, etc.)? Do you believe this is beneficial to the design process?
13. Which research method do you use to develop the persona? Why do you use this method?
14. Do you select one, two or more personas when working on a project? When do you know you will need to create this

many personas? Does this change after you have begun your research?

15. Are personas easy to develop? Please explain your answer.
16. Would you please tell me a story about when you recognized the emergence of personal predisposition in the research?
17. When you are aware of bias; what do you do? How do you handle it?
18. Please give a personal quote with regards to personas/or persona development.

Appendix B

Observation Script

Hi, _____. My name is Robin and, I'm going to be walking you through this session today. Before we begin, I have some information for you, and I'm going to read it to make sure that I cover everything.

You probably already have a good idea of why I've asked to meet with you but let me go over it again briefly. I am asking people to try using the Water Ways Application which is featured in the Smithsonian Institution's traveling Water Ways Exhibition. I am asking people to try using the app that is already on tour to see whether it works as intended. The session should take about 10 – 15 minutes. The first thing I want to make clear right away is that I'm testing the usability of the application, not you. You can't do anything wrong here. In fact, this is probably the one place today where you don't have to worry about making mistakes. As you use the app, I'm going to ask you as much as possible to try to think out loud: to say what you're looking at, what you're trying to do, and what you're thinking. This will be a big help to me. Also, please don't worry that you're going to hurt my feelings. I'm doing this to Arizona State University (ASU) and the Institutional Review Board (IRB) testing protocol to improve the app, so I need to hear your honest reactions. If, you have any questions as we go along, just ask them. I may not be able to answer them right away, since I'm interested in how people do when they don't have someone sitting next to them to help. If, you still have any questions when we're done I'll try to answer them then. And if you need to take a break at any point, just let me know. You may have noticed the camera. With your permission, I'm going to record what happens on during your interaction with the app and our conversation. The recording will only be used to help me figure out how to develop user personas that will help designers improve the app, and it won't be seen by anyone except the me. And it helps me, because I don't have to take as many notes.
Do I have your permission to begin?

USABILITY TESTING PROTOCOL

First, I'm going to ask you to look at this app and tell me what you make of it: what strikes you about it, what kind of app do you think it is, what you can do here, and what it's for. Just look around and do a little narrative.
You can scroll if you want to, but don't click on anything yet.

Thanks. Now I'm going to ask you to try doing some specific tasks and ask you some questions. I'm going to read each one out loud and give you a printed copy.

I'm also going to ask you to do these tasks without asking for my assistance. I'll learn a lot more about how well your user experience and the how well the app works that way.

Again, as much as possible, it will help me if you can try to think out loud as you go along.

(Perform the Tasks)

Do you have any questions for me, now that we're done? Thank you very much for your help.

Task 1

Begin by finding the **Introduction** tab and then open it. What is it telling you?

Do you know what to do next?

What do you think you should do? Why?

Please remember to talk out-loud, describing your thoughts as you read each of the pages, follow instructions and make your selections, or decisions.
Task 2

Select the **Play Game** tab and open it.

What is it telling you?

Do you know what to do next?

What do you expect to see?

What is it telling you to do?

What would you press next?

What do you expect to see?

Do you think you would need assistance figure this out? How would you get it? **Please remember to talk out-loud, describing your thoughts as you read each page, follow instructions and make your selections.**

Task 3

Provide user experience feedback. While giving your feedback feel free to press the tabs again, to interact with the app again.

What did you expect when you began using the app?

Were the instructions clear and easy to follow?

Were your expectations met? Please tell me how or how not.

While using the app; were you confused or frustrated? If so, at what point did you become frustrated?

Over all, how did the app make you feel? Please tell me more.

Would you be excited to tell a friend about the app?

Why or why not? **Please remember to talk out-loud, describing your thoughts as you read each of the pages, follow instructions and make your selections or decisions.**

Task 4

Complete the attached Participant Exit Survey. The purpose of this survey is to ask you to provide additional feedback that will improve the user experience.

Appendix C

Informed Consent to Participate in Research

Research: Bringing Personas to Life Through Ethical Research

I am a graduate student under the direction of Claire Lauer, PhD at the College of Integrative Sciences and Art at Arizona State University (ASU). I am investigating the processes of persona development. I am testing the usability of the WaterSim America app (WSAA) on rural populations. For this applied project, I will conduct contextual inquiry while observing participants interact with the SWSA and interview them about their experience with the app. Persona practitioners conduct these types of studies to create a real/accurate prospective of actual users. In other words, observing participants engaging with the app will help me identify whole characteristics of end users. I will use those observations and the interview material I collect to develop personas that represent typical rural users so those personas can be used by the developers at DCDC to improve the app for users who might attend the Water Ways exhibit in other states.

I am inviting your participation, which will involve observations two brief interviews and one usability study. I will work with you to arrange convenient times for me to observe you interact with the app. I will conduct approximately 1-2 hours of observation during the course of one day. Before I began the observation, I will conduct a 15-minute telephone interview, for the purpose of collecting some information about your background and to schedule the study. During the usability study, I will conduct a second

30-45-minute contextual usability observation supplemented by a brief **fifteen-minute exit survey** to gather more in-depth information about your interaction with the SWSA. The interviews will be digitally recorded. My total involvement with you will be app approximately 2-4 hours per participant. You have the right not to answer any question, and to stop participation at any time. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty, in other words, my research nor my grade will be affected by your withdrawal from the study. You must be 18 years or older to participate in the study.

Your contribution in this study will be used to help ASU's DCDC to construct relevant products. The data I collect from testing the existing SWWA app on members of that target audience (rural) will help future iterations of the app have higher engagement and impact on those populations. There are no foreseeable risks or discomforts to you participant.

All participants will be given a research ID. All research data will be kept confidential and will be stored on a secure server account. Digital audio-recordings of the interviews will include no personal identifying information and will be heard only for research purposes by the researcher. After interviews are transcribed and/or coded, the digital files will be retained for future analysis for no more than one year. A master list in the form of an Excel spreadsheet will be maintained in order to link participant numbers to observations and separate pre- and post-interviews. After data has been linked by participant number, the master sheet will be destroyed. The results of this study may be used in reports, presentations, or publications but your name will not be used.

I would like to audio record or video record this interview. The interview will not be recorded without your permission. Please let me know if you do not want the interview to be recorded; you also can change your mind after the interview starts, just let me know.

If you have any questions concerning the research study, please contact me at: xxx-xxx-xxxx or email -----@gmail.com, or -----@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Please let me know if you wish to be part of the study.

By signing below, you are agreeing to be part of the study.

Name: _____

Signature: _____ Date: _____

US DEPARTMENT OF THE INTERIOR/BUREAU OF RECLAIMATION

SMITHSONIAN INSTITUTION MRC
941 PO Box 37012 Washington DC 20013-7012 Telephone 202.633.3120 Fax 202.633.5345

Smithsonian Waterways Exhibition

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Our world is made of water and, so are we. *Water/Ways*, an exhibition from Museum on Main Street, takes a deep look at this essential component of life on our planet, which powers the environment's engine, impacts climate and helps shape and sculpt the landscape. Humans and animals rely on water for health, hydration, food supplies, and hygiene.

But, water's impact on humans is much more than just biological and environmental. Water is an important element in American culture. We are attracted to water as a source of peace and contemplation. Water carves out a place in our memories of where we live and play. We cherish our connections to nature, particularly the sights, the sounds, and the sense of place we feel at the water's edge.

Americans are connected to water in ways they may not always realize. And, since water is a shared resource, water connects everyone. With compelling text, imagery, interactives, and videos, *Water/Ways* reveals the central nature of water in our lives by exploring a number of important questions:

- How do Americans use water?
- How does water unite communities?
- How does water affect the way we live, work, worship, create and play?
- How do we care for water and sustain it for the future?

Please access the following links for more information and tour dates:

MuseumOnMainStreet.org.
www.sites.si.edu
https://twitter.com/sitesexhibits?lang=en

SITES **SI** *Traveling Exhibits*
@sitesExhibits
Be on the lookout, cause @MuseumOnMainSt's #WaterWays keeps moving. Catch the awesome opportunities in a bevy of great communities where you can

#ThinkWater

ASU Arizona State University
Robin Coburn
Graduate Student, Arizona State University College of Integrative Sciences and Arts
rcoburn1@asu.edu